ligands; ammonium salts; phosphonium salts; and combinations thereof that provides selective binding of said analyte.

8. The sequentially functionalized sorbent of claim **7**, wherein said heteroaromatic ligands are selected from the group consisting of: pyridines; 1,10-phenanthroline; 2,2'-bipyridine; and combinations thereof.

9. A method for making a sorbent for retention of a target analyte, comprising the steps of:

sequentially functionalizing pores of porous support by:

1) attaching a quantity of short-chain alkyl aminosilanes within said pores to passivate surfaces therein, wherein said short-chain alkyl aminosilanes include a tether group portion with a chain length of 4 atoms or less and a terminal amine group portion with a chain length of 7 atoms or less coupled thereto, allowing unhindered passage of larger molecules within said pores thereafter;

2) interspersing polyfunctional oligomeric aminosilanes within said pores between said short-chain alkyl aminosilanes and chemically anchoring same therein; and

3) backfilling said pores with another quantity of short-chain alkyl aminosilanes to maximize density of active binding sites within said pores;

wherein said short-chain alkyl aminosilanes and said oligomeric aminosilanes provide a uniform density of active binding sites within said pores defined by a quantity of nitrogen greater than or equal to about 5.0×10^{-3} mmol. N per m^2 of pore surface area for chemical binding and retention of said target analyte therein.

10. The method of claim **9**, wherein said short-chain alkyl aminosilanes are of a size below about 20 Å and said polyfunctional oligomeric aminosilanes are of a size greater than about 20 Å.

11. The method of claim **9**, wherein said short-chain alkyl aminosilanes are selected from the group consisting of: aminopropylsilanes; 3-(2-aminoethyl)aminopropylsilanes; 3-(diethylenetriamine)-propylsilanes; and combinations thereof.

12. The method of claim **9**, wherein said terminal amine group portion of said short-chain alkyl aminosilanes comprises diethylenetriamine (DETA).

13. The method of claim **9**, wherein said short-chain alkyl aminosilanes include diethylenetriamine (DETA) propyltrimethoxysilane.

14. The method of claim **9**, wherein the sequentially functionalizinq includes heating said porous support at a temperature in the range from about 50° C. to about 150° C.

15. The method of claim **9**, wherein said polyfunctional oligomeric aminosilanes are selected from the group consisting of: polyethylene imines; aminodendrimers; aminated polymers; aminated chitosans; aminoethylcelluloses; aminomethylpolystyrenes; and combinations thereof.

16. The method of claim **9**, wherein said polyfunctional oligomeric aminosilanes include polyethylene imine (PEI).

17. The method of claim **9**, wherein said polyfunctional oligomeric aminosilanes include polyethylene imine (PEI) that has been chemically modified to include a propyltrimethoxysilane anchor.

18. The method of claim **9**, wherein the backfilling includes backfilling with a short-chain alkyl aminosilane selected from the group consisting of: aminopropylsilanes; 3-(2-aminoethyl)aminopropylsilanes: 3-(diethylenetriamine)-propylsilanes; and combinations thereof.

19. The method of claim **9**, wherein the backfilling includes crosslinking adjacent silane groups of said short-chain alkyl aminosilanes and said polyfunctional oligomeric aminosilanes at said surfaces.

20. The method of claim **9**, wherein said binding sites are further modified to include a functional group selected from the group consisting of: thiols; carboxylates; sulfonates; phosphonates; phosphines; heterocyclic aromatic rings; ammonium salts; phosphonium salts; and combinations thereof that provide selective binding of said analyte.

21. The method of claim **9**, wherein said sorbent is a component of a sorption device or sorption system.

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